



# Fetal Alcohol Spectrum Disorders

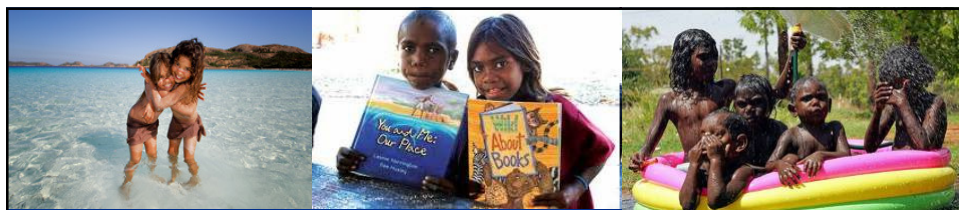
Dr Raewyn Mutch <sup>1,2,3</sup> and Dr Amanda Wilkins <sup>1,3</sup>  
with additional slides from colleagues Rachael Fallows <sup>3</sup> and Sue Miers <sup>4</sup>.

- (1) Telethon Institute for Child Health Research, Alcohol and Pregnancy
- (2) Princess Margaret Hospital for Children, Refugee Health
- (3) Child and Community Health, Child Development
- (4) NOFASARD

## Fetal Alcohol Spectrum Disorders FASD

- Alcohol and Us
  - Evidence for alcohol misuse
- Aetiology
  - Animal studies, human studies
- Clinical
  - Physical stigmata, behaviours
- Diagnosis
  - Multidisciplinary teams
  - Medical, occupational therapist, neuropsychologist, speech and language therapist, social worker, family liaison
- Interventions
- Therapies





## Specific Cultural and Structural Contexts





## Facts

- Problems with alcohol began with “colonisation”.
- Contrary to public perception, surveys demonstrate proportionally fewer Aboriginal people drink alcohol than Non- Aboriginal.
- Media tend to get some facts wrong, ignoring efforts by communities to get dry and reinforcing stereotyping.

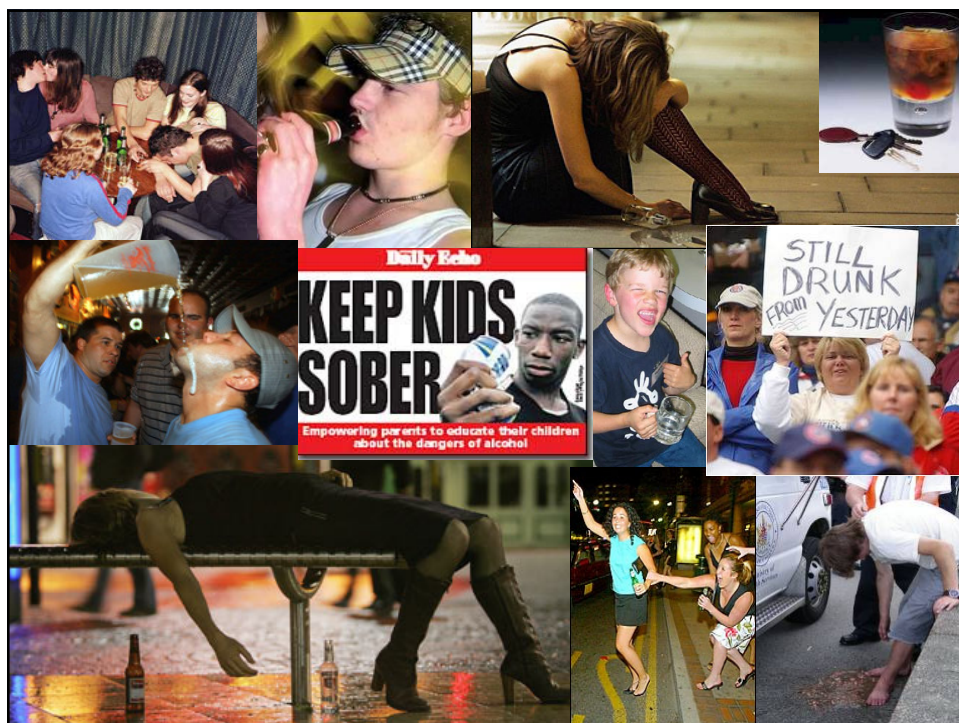
Read more: <http://www.creativespirits.info/aboriginalculture/health/aboriginal-alcohol-consumption.html#aboriginal-alcohol-consumption-in-media#ixzz0Y0pO64>







# Common Cultural Context of Alcohol





## Alcohol – Art + “Culture”

A black and white photograph of a young boy running down a street, holding a bottle.

A colorful abstract painting with splatters and drips.

A photograph of three young women smiling together.

A magazine cover featuring Amy Winehouse. The text on the cover includes "Rolling Stone", "Summer Tours", "The White Stripes", "Velvet Revolver", "Dave Matthews", "The Diva & Her Demons", and "Amy Winehouse".

A photograph of a young woman with red hair.

A photograph of two young women smiling.







## Advertising Alcohol

- The 30 most exposed advertisements 2005 to 2006:
  - analysed for appealing to children and underage youth
- All contained at least one element known to appeal (a)
  - 23 contained two or more
  - Half featured an animal
- Three-quarters of Australian children recognise Bundy Bear (b)

(a) Fielder, Lynda, Donovan, Robert J, Ouschan, Robyn. School of Marketing, Curtin University, Perth, Western Australia 6845, Australia. "Exposure of children and adolescents to alcohol advertising on Australian metropolitan free-to-air television." Comment in: *Addiction*. 2009 Jul;104(7):1166-7; PMID: 19563561

(b) Carter, Owen, Phan, Tina, Donovan, Robert. "Three-quarters of Australian children recognise Bundy B. Bear: alcohol advertising restrictions are not working." *Australian & New Zealand Journal of Public Health*. 34(6):635-6, 2010 Dec.



## Revenue from consumption of alcohol by adolescents: 2005

- 2005 Australian Secondary School Surveys Alcohol + Drug Use
- 506,000 adolescents (12 - 17 years ; 29% of all youth)
- Consumed ~175.69 million standard drinks
- Revenue generated ~ \$218 million
  - Tax ~ \$107 million
- ~ \$430.84 for every underage youth

Doran, Christopher M. Shakeshaft, Anthony P. Hall, Wayne, Petrie, Dennis, National Drug and Alcohol Research Centre, University of New South Wales, Sydney 2052 NSW, Australia. "Alcohol industry and government revenue derived from underage drinking by Australian adolescents 2005." *Addictive Behaviors*. 34(1):75-81, 2009 Jan.



## Adolescent



- Consumption of alcohol is beginning earlier
  - an increasing proportion at high risk and hazardous levels
- Twice as likely for a teenage rapid repeat pregnancy if drinking alcohol (b)
- Increased risks of STDs
- Poor school performance
- Risky driving in early adulthood and adolescent problem behaviours (c)
  - risky driving with alcohol or binge alcohol
  - suicides, homicides, and violence
- Schoolies week - expect to be drunk most nights or every night of their holidays (d)

(b) Lewis, Lucy N, Doherty, Donata A, Hickay, Martha, Skinner, S Rachel, University of Western Australia, Perth, WA, Australia. "Predictors of sexual intercourse and rapid repeat pregnancy among teenage mothers: an Australian prospective longitudinal study." *Medical Journal of Australia*. 193(6):338-42, 2010 Sep 20.

(c) Vassallo, Suzanne, Smart, Diana, Sanson, Ann, Cockfield, Samantha, Harris, Anne, McIntyre, Allison, Harrison, Warren. Australian Institute of Family Studies, 20/485 La Trobe St., Melbourne, Vic. 3000, Australia. "Risky driving among young Australian drivers II: Co-occurrence with other problem behaviours". *Accident Analysis & Prevention*. 48(1):37-46, 2009 Jan.

(d) Smith, A M, Rosenthal, D., Centre for the Study of Sexually Transmissible Diseases, La Trobe University, Melbourne. "Yes, alcohol and drugs? Young people's experience of Schoolies Week." *Australian & New Zealand Journal of Public Health*. 21(2):178-80, 1997 Apr.





## Sexual Debut & Alcohol



- ~ 13% of the Australian population report **being frightened or forced into a sexual experience**
- Mean age **first coerced into sexual activity** is 16 years (a)
- Significant proportion of sexually active secondary school students report **unwanted or unprotected sex as a result of being intoxicated** (b)
- Same-sex attracted young people experience high levels of harassment, bullying and abuse, *as well as high rates of* legal and illegal substance use

RACGP: Vol 36, (8) 577-672; Sex, contraception and health (a) de Visser RO, Smith AMA, Rissel CE, Richters J, Grulich AE. *Experiences of sexual coercion among a representative sample of adults*. Aust N Z J Public Health 2003;27:198-203.  
 (b) Smith A, Agius P, Dyson S, Mitchell A, Pitts M. *Secondary students and sexual health, 2002. Monograph Series No.47*, Melbourne: Australian Research Centre in Sex, Health and Society, La Trobe University, 2003.  
 (c) Hillier L, Turner A, Mitchell A. *Writing themselves in again: 6 years on. The second national report on the sexual health and wellbeing of same-sex attracted young people in Australia*. Monograph Series No.50. Melbourne: Australian Research Centre in Sex, Health and Society, La Trobe University, 2004.

## Family Structure and Function

- 8256 students (aged 10-14 years).
- Family management
- Higher family management – adolescents were
  - **less likely** to have drunk alcohol in their life-time,
  - **less likely** to drink alcohol in the preceding 30 days
  - **less likely** to have had an alcohol binge.
- Reporting emotionally close relationships with their **fathers** were
  - **less likely** to have drunk alcohol in their life-time
  - **less likely** to have had an alcohol binge in the preceding fortnight.



Habib, Cherine, Santoro, Joseph, Kremer, Peter, Toumbourou, John, Leslie, Eva, Williams, Joanne. School of Psychology, Deakin University, Geelong Waterfront Campus, Victoria, Australia. [habibche@deakin.edu.au](mailto:habibche@deakin.edu.au); *The importance of family management, closeness with father and family structure in early adolescent alcohol use*. Addiction. 105(10):1750-8, 2010 Oct.

# Fractured families

- Strongest predictor of more problematic patterns of drinking by adolescents
  - More frequent maternal partner change
  - Lower levels of control
- Low control measured when child was aged 5
  - predicted adolescent occasional drinking patterns at age 14.



- Domestic Violence
- Homicide
- Apprehension

Alm, Ross Mahoney, Elizabeth, Hutchinson, Debra M. Naiman, Jake M. Martick, Richard P. Bor, William Williams, Gail M. School of Population Health, University of Queensland, Australia.  
 "Do maternal parenting practices predict problematic patterns of adolescent alcohol consumption?"  
 Comment in: Addiction. 2010 May;105(5):881-2; PMID: 20402975. Addiction. 105(5):872-80, 2010 May.



# Alcohol Advertising Targets Women



[http://www.vintagecellars.com.au/pdfs/CP111/CP111%20Catalogue\\_WA.pdf](http://www.vintagecellars.com.au/pdfs/CP111/CP111%20Catalogue_WA.pdf)

**Guest Contributor** Kate Waterhouse. Style and Fashion Editor for the Sun Herald in Sydney, Lifestyle YOU presenter, the list goes on. As part of this country's racing royalty, Kate Waterhouse has grown up in the media spotlight. Away from the racetrack, **Kate is making every post a winner.** With a Bachelor of Arts - Media and Communication, **Kate has a career** in journalism and has already **worked** with leading newspapers and magazines in Australia and internationally **as well as regular appearances on TV.** We're delighted to have fashion forward Kate **on board as** guest contributor for our spring edition.

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## Pregnancy and Drinking

- 47% of Australian women did not plan their pregnancy (Colvin et al 2007)
- 80% of Australian women reported drinking alcohol in the first 3 months of pregnancy (Colvin et al 2007)
- 59% of Australian women drank alcohol in at least 1 trimester of pregnancy (Colvin et al 2001)
- 16% of Australian women do not know the effects of alcohol on the fetus are permanent (Peadon et al 2010)
- 93% of Australian women agreed that alcohol can affect the unborn child (Peadon et al 2010)



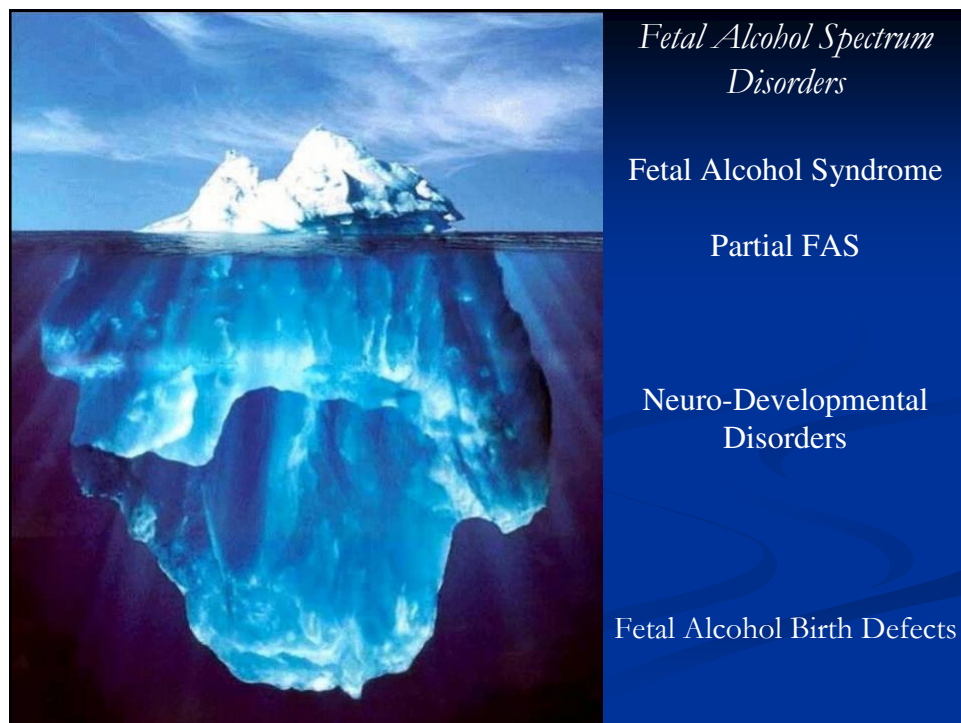
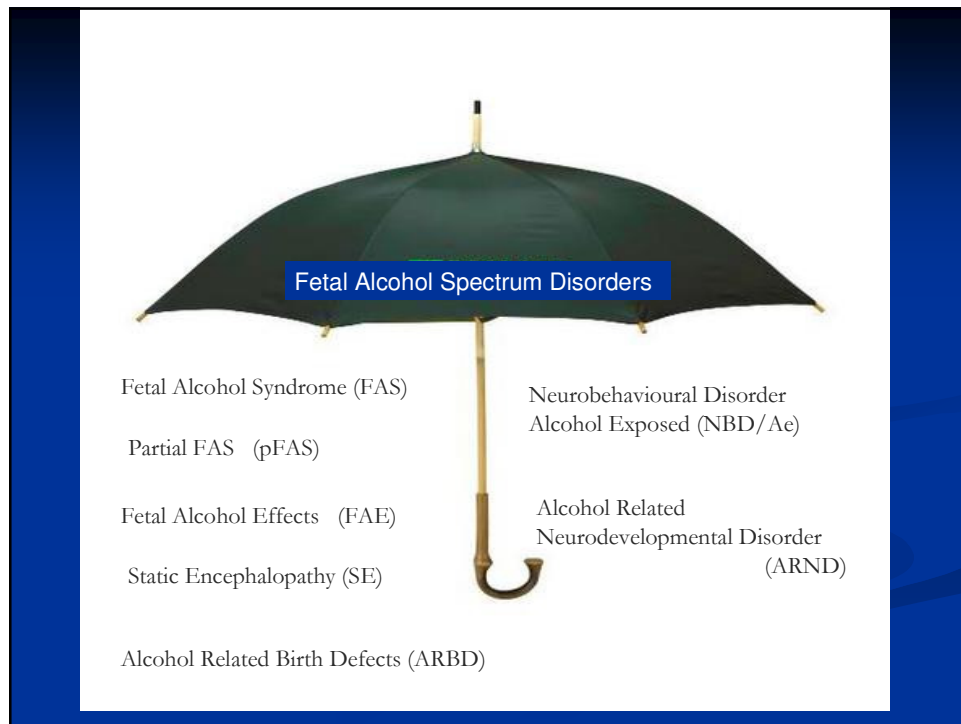


“Of all the substances of abuse (including cocaine, heroin, and marijuana), alcohol produces by far the most serious neurobehavioral effects in the fetus.”

*IOM Report to Congress, 1996*

## Fetal Alcohol Spectrum Disorder (FASD)

- Individuals exposed to prenatal alcohol
  - Alcohol is a teratogen
- Permanent BioPhysical Deficits
  - Lifelong disability and morbidity
  - Developmental, Learning, Cognitive and Behavioural deficits
- Fetal Alcohol Syndrome (FAS)
  - leading cause of non-genetic mental retardation in the Western World
  - Unique cluster of facial anomalies
- Children without facial anomalies
  - may have hidden disability



## What is FAS?

### Are we any good at diagnosing FAS?

- There is paucity of knowledge about FAS and FASD
- There is failure to ask about alcohol consumption during pregnancy
- FAS is likely to be under-reported and under-diagnosed.
- A child with FASD may remain “hidden” until learning or behavioural difficulties manifest

## Alcohol consumption during pregnancy

Australian State	Year & Policy	Alcohol Consumption
<b>Queensland</b> Antenatal survey ( <i>first visit</i> )	1981-84 Abstinence	50% drank in early pregnancy 20% binged early pregnancy 36% drank during late pregnancy
<b>Western Australia</b> Post-partum survey ( <i>3 months post-partum</i> )	1995-97 Abstinence	59% drank during pregnancy 4% binged early pregnancy 50% drank during late pregnancy
<b>All Australia</b> National Household Survey ( <i>during pregnancy</i> )	2004 1-2 Std Drinks/Day No binge drinking	47% drank during pregnancy and breastfeeding

CB\_Canada2009\_040309.ppt



# FAS in Australia

CB\_Canada2009\_040309.ppt

1.8 per 10,000 total  
27.6 per 10,000 Aboriginal  
WA Birth Defects Registry 1980-97  
*Bower et al 2000*

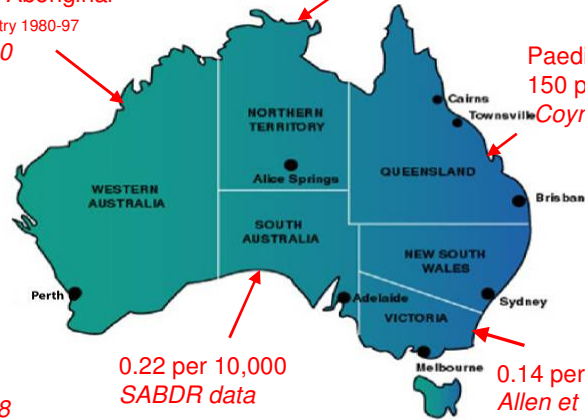
18.7 per 10,000 Aboriginal  
*Harris et al 2003*

Paediatric service  
150 per 10,000  
*Coyne et al 2008*

**Australia**  
0.6 per 10,000  
*Elliott et al 2008*

0.22 per 10,000  
SABDR data

0.14 per 10,000  
*Allen et al 2007*



## (A.U.D.I.T.) AUDIT



<http://www.dva.gov.au/health/younger/mhealth/alcohol/training/manual.pdf>

## Standard Drinks\*



<b>1.5</b>	<b>1</b>	<b>0.5</b>	<b>1</b>	<b>1</b>	<b>1.8</b>
375 ml	285 ml Middy	285 ml Middy	30 ml	100 ml	180 ml
Full Strength Beer	Full Strength Beer	Light Beer	Spirit Nip	Standard Serve of Wine	Average Restr't Serve of Wine
4.9%	4.9%	2.7%	40%	12%	12%
Alc/Vol	Alc/Vol	Alc/Vol	Alc/Vol	Alc/Vol	Alc/Vol

\*Australian Alcohol Guidelines Health Risks and Benefits (2001). National Health & Medical Research Council. Commonwealth of Australia.

What is a safe level of alcohol?

What are health professionals actually told?

# Drug harms in the UK

Lancet, Nov 01, 2010 **Background**

- Multicriteria decision analysis (MCDA) modelling.

## Methods

- Members of the Independent Scientific Committee on Drugs, + two invited specialists,
- 1-day interactive workshop to score 20 drugs on 16 criteria:
  - nine criteria related to the harms a drug produces in the individual
  - seven criteria related to the harms a drug produces to others.
  - drugs were scored out of 100 points; criteria weighted to indicate relative importance

## Findings

- Heroin, crack cocaine, and metamphetamine most harmful to individuals (34, 37, 32)
- **Alcohol**, heroin, and crack cocaine were the **most harmful to others** (46, 21, 17)
- **Alcohol**, heroin and crack cocaine **most harmful overall** (72, 55, 54).

## Interpretation

- scoring and weighting increases the differentiation between the most and least harmful drugs

# Survey of women who gave birth 1995 - 97: Alcohol consumption during pregnancy

- ~ 4714 non-Aboriginal women surveyed three months after birth
- 40% of women abstained and 16% refused alcohol in their first trimester only
- Categorisation: *A standard drink = 10 grams of alcohol, which equates to 100 millilitres of wine.*
  - Heavy = > 7 std drinks/ week and/or bingeing on > 5 std drinks/session/ >weekly
  - Moderate = 7 std drinks/week and/or bingeing > 5 std drinks / session/ < weekly
  - Low = < 7 std drinks/week and ≤ 2/day
- 306 children diagnosed with a variety of birth defects
- 51 children diagnosed with defects specifically associated with alcohol consumption
- Mothers who drank heavily during the first trimester were 4x more likely to have children with an associated birth defect:
  - cardiac (VSD, ASD)
  - renal
  - optical
  - skeletal
  - congenital deafness
- **not all outcomes of alcohol exposure** make it onto the BDR



## TICHR - Raine Study

- Robinson, et al; Study strengths:
- Prospective pregnancy cohort  
retrospective recall bias of alcohol consumption
- Longitudinal nature  
assessment of behaviours at multiple stages of development.
- Large sample size (n=1860)  
ample statistical power for detecting differences among groups.
- Measured and statistically adjusted for potential confounding variables
- Outcome measure the Child Behavioural Checklist (CBCL)  
validated measure of behavioural and emotional problems in children and adolescents

J Popul Ther Clin Pharmacol Vol 17 (2) Summer 2010:e323-e330; October 18, 2010

## TICHR - Raine Study

- Robinson, et al. continued
- Prenatally exposed to **low levels of alcohol within for the first 3 months of pregnancy** ~ significantly lower risk of total and **internalizing** behaviours on CBCL
- Prenatally exposed to **light to moderate levels of alcohol at 18 weeks** ~ significantly lower risk of total, internalizing and **externalizing** behaviours CBCL
- Both are compared with children of mothers who abstained.

# Methodological limitations

- Selective attrition of research participants.
  - approximately one third of mothers lost to follow-up
  - under the age of 20, single parent, not completed high school,
  - very low socio-demographic profile
- If an interaction effect between alcohol exposure and SES exists
  - the outcomes described might have looked different
- Failure to control for maternal psychopathology
  - alters self reporting and interpersonal assessments
- Child Behaviour Checklist (CBCL)
  - impervious to actual measures necessary to assess for FASD

J Popul Ther Clin Pharmacol Vol 17 (2) Summer 2010:e323-e330; October 18, 2010

# Prenatal alcohol exposure and child behaviour problems

- Prenatal alcohol exposure at **moderate ( 3-4 drinks/occasion)** and **higher levels** increased odds of **child behaviour problems**
  - 10% random sample WA women delivering (1995-96)
  - 8-year longitudinal survey (78% response n = 2224)
  - Follow-up: 85% 2 yrs; 73% 5 yrs; 61% 8 yrs
- *Attrition, CBCL and Postnatal recall on consumption*

Addiction. 105(1):74-86, 2010 Jan.

## Dr Alex Wodak agrees.....

Director, Alcohol and Drug Service, St  
Vincent's Hospital, Sydney

“I think it's partly because alcohol seems so innocuous, it seems so safe that people unfortunately draw that conclusion that it really is safe and a lot of people have far too much alcohol, either because they drink a huge quantity in a short period of time or they consistently drink far too much over a long period of time.”

<http://www.abc.net.au/news/stories/2010/11/01/3054392.htm>

## *Take home message*

2009 revised NHMRC Drinking Guidelines recommend

“ for women who are pregnant or planning a pregnancy,  
**not drinking is the safest option.**”

[http://www.nhmrc.gov.au/\\_files\\_nhmrc/files/publications/synopses/dk10-alcohol.pdf](http://www.nhmrc.gov.au/_files_nhmrc/files/publications/synopses/dk10-alcohol.pdf)

“Presently, no clear threshold limit can be established, and thus the only socially responsible message to deliver regarding alcohol use during pregnancy is **abstinence**”

J Popul Ther Clin Pharmacol Vol 17 (2) Summer 2010;323-330; October 18, 2010

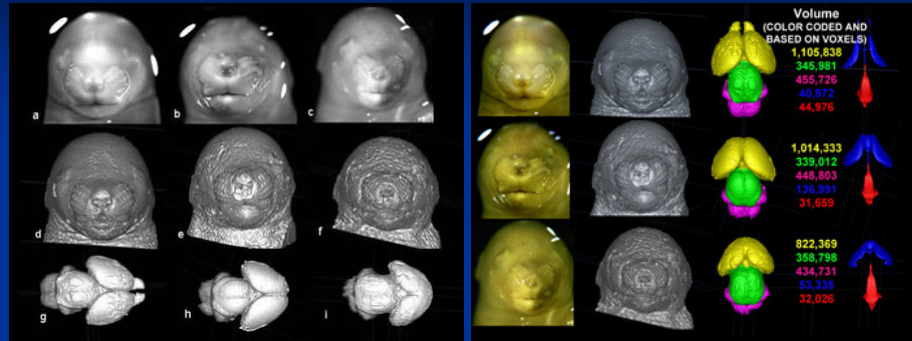


NO alcohol in pregnancy is the  
safest choice



## Alcohol Effects Biophysical

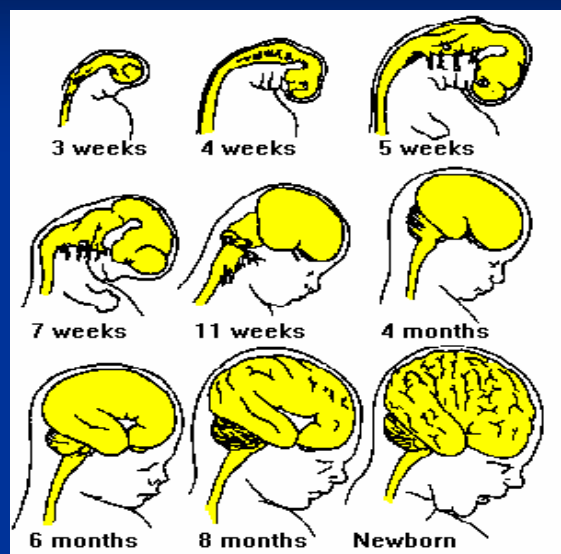
## Animal Studies

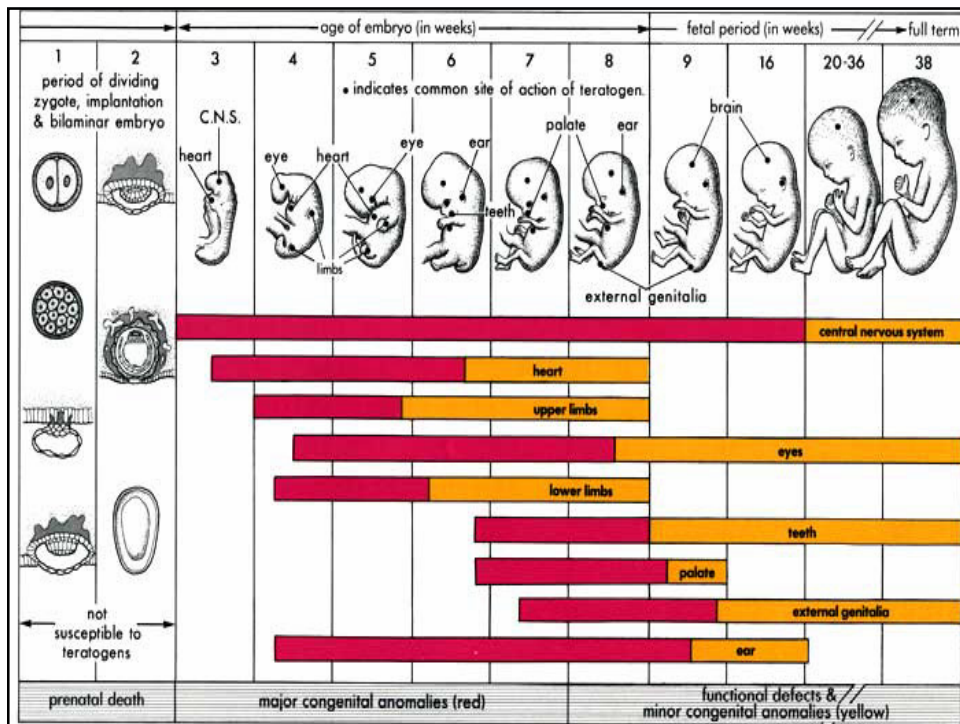


- Dr K Sulik and team, University of North Carolina
- Limitations of animal studies
- Human alcohol consumption: amount, frequency, timing *and other factors*

[www.med.unc.edu/.../images/Slide22.jpg](http://www.med.unc.edu/.../images/Slide22.jpg)

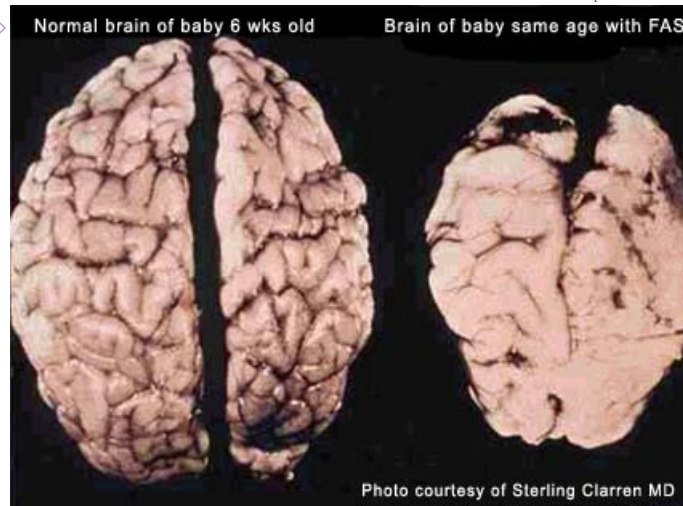
## Embryology-time frame for the Brain





## FAS and the Brain

Permission to use photo on file.



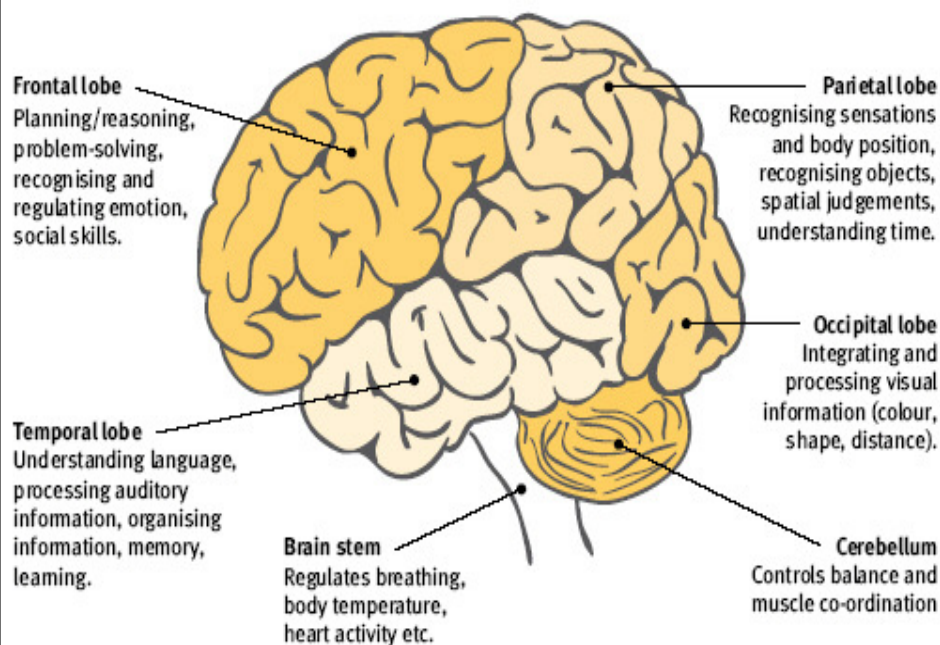
## FAS and the Brain



**A.** Magnetic resonance imaging showing the side view of a 14-year-old control subject with a normal corpus callosum; **B.** 12-year-old with FAS and a thin corpus callosum; **C.** 14-year-old with FAS and agenesis (absence due to abnormal development) of the corpus callosum.

Source: Mattson, S.N.; Jernigan, T.L.; and Riley, E.P. 1994. MRI and prenatal alcohol exposure: Images provide insight into FAS. *Alcohol Health & Research World* 18(1):49-52.

### Areas of the brain (side view)



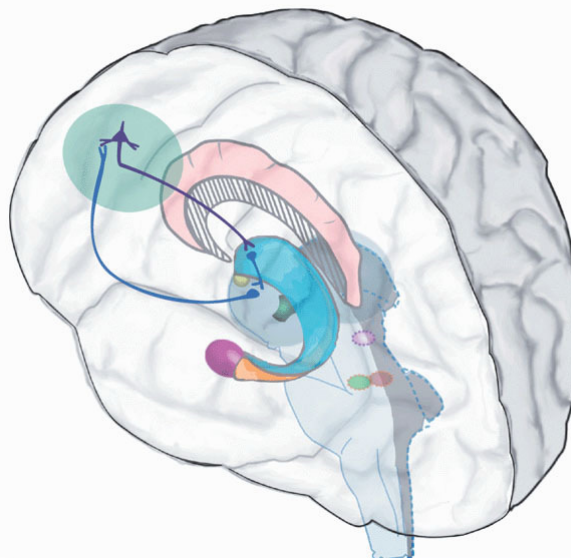


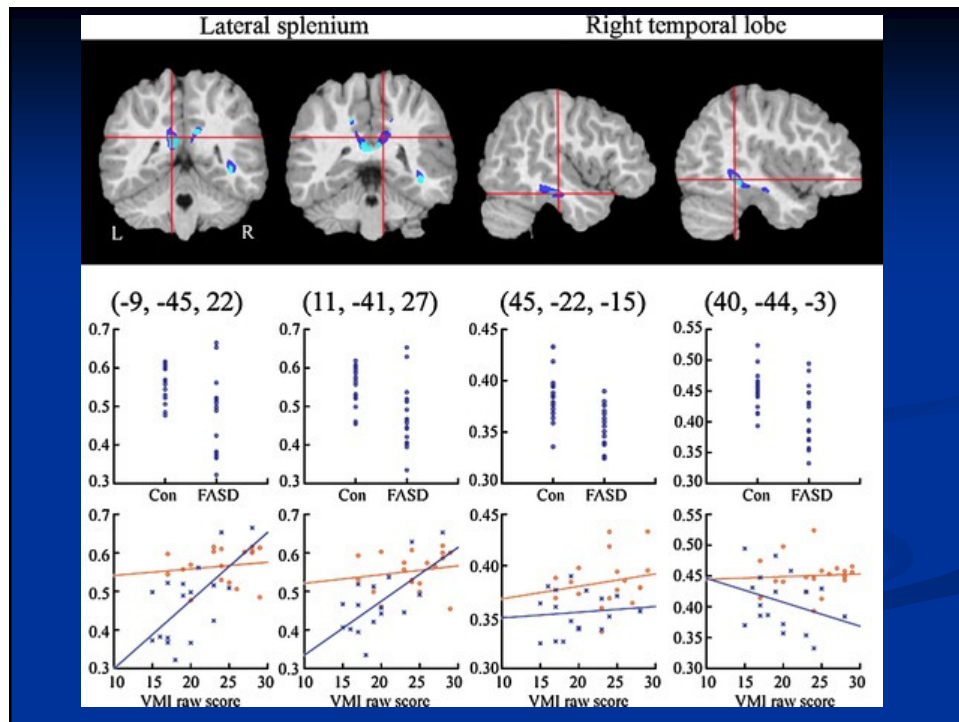
## Other regions

- Basal Ganglia
  - Memory
  - Time Perception
  - Setting Goals
  - Predicting Outcomes
- Hippocampus
  - Learning and memory
- Reduced Purkinje Cells
- Reduced GABA, NO, Serotonin
- Reduced Pruning

### Hypothetical CSTC Loop for Executive Functions

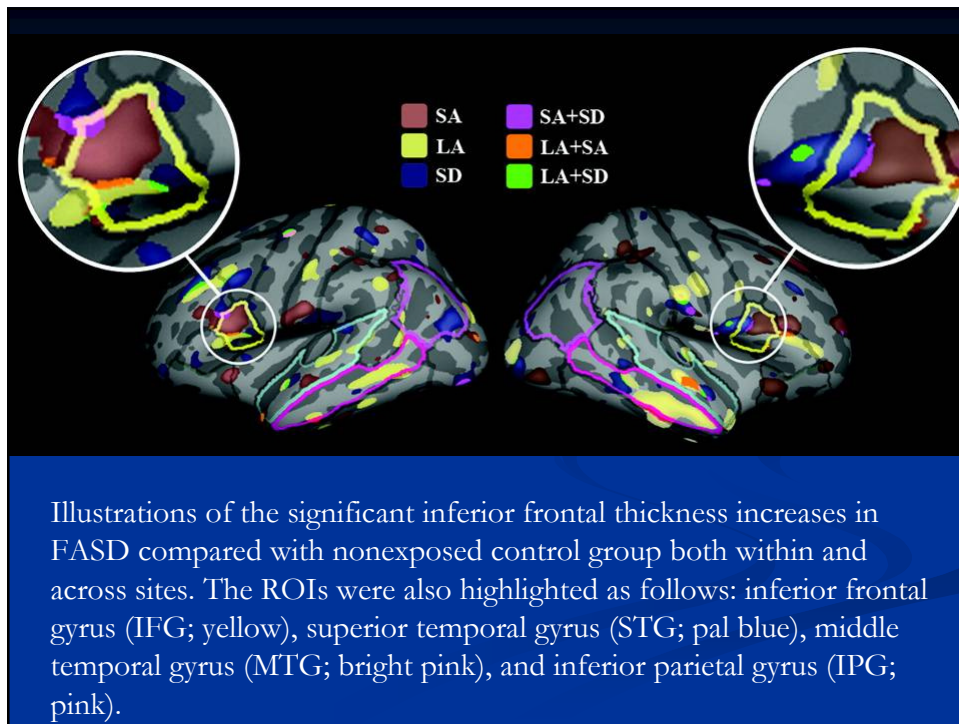
DLPFC → Striatum → Thalamus → DLPCF



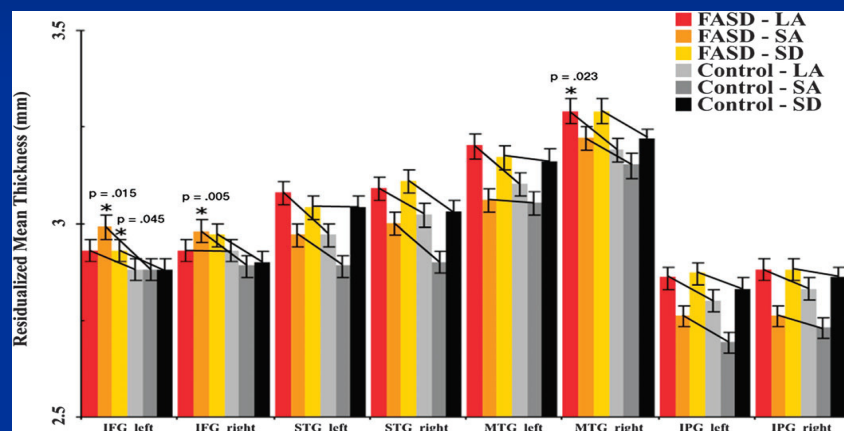


## MRI measured changes

- a greater involvement of disrupted pruning process in the brain development of FASD.
- [http://pubs.niaaa.nih.gov/publications/arh341/toc34\\_1.html](http://pubs.niaaa.nih.gov/publications/arh341/toc34_1.html)
- correlates with Palpebral Fissure Length (PFL)



## Increased frontal thickness



# Clinical Features

Physical features

Behaviour

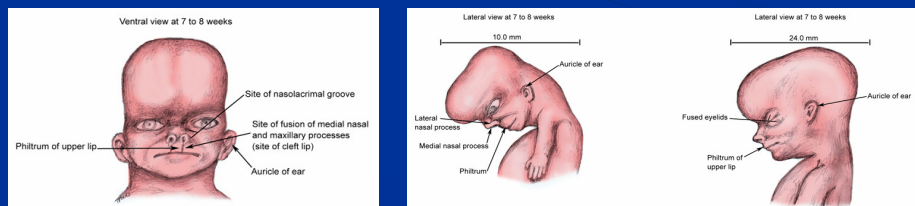
## Physical

- Head
  - circumference
- Face
  - Facial development occurs between the fourth and eighth weeks of gestation.
  - Mouth and nose
  - Ears
- Peripheral signs
  - Hands
- Growth
  - Birth and Longitudinal measures

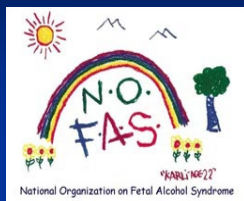


## End of week seven of development

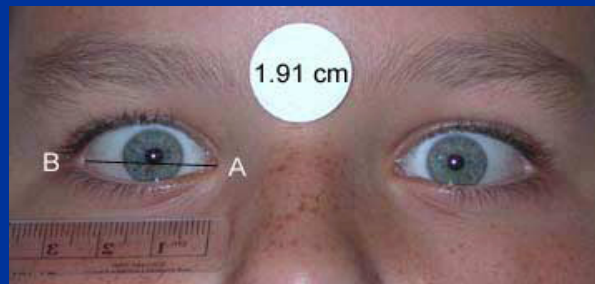
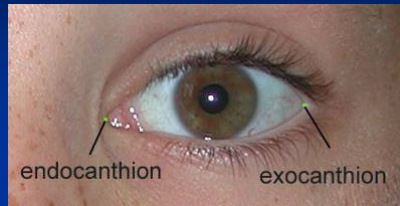
- The pattern of facial features has taken on a human appearance.
- Facial proportions develop during the fetal period.
- The fusion of the medial nasal prominences, which forms the central axis of the nose and the philtrum of the lip, is complete.



## Facial Features of FAS



## Palpebral Fissure



Cranston, M. E., A. A. Mhanni, et al. (2009). "Concordance of three methods for palpebral fissure length measurement in the assessment of fetal alcohol spectrum disorder." *Canadian Journal of Clinical Pharmacology* 16(1): e234-e241.

## Facial Photography



## Lip Circularity

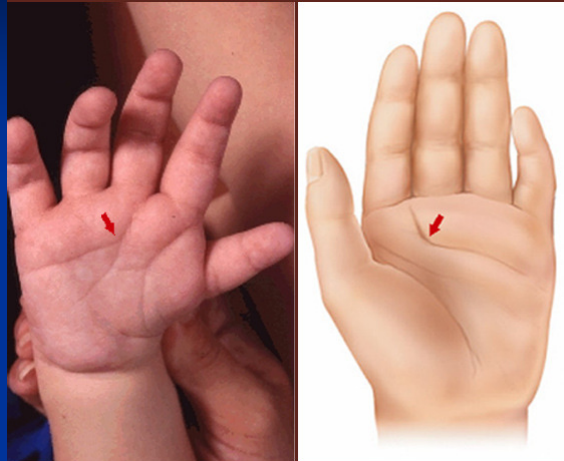


## Saccadic Eye Movements

- Courtney R. Green, Douglas P. Munoz, Sarah M. Nikkel, and James N. Reynolds
- 8–12 years olds, look toward (pro saccade) or away (anti saccade) from a stimulus -appearing in peripheral visual field.
- FASD children elongated reaction times, ↑ direction errors
- A *trend toward* ↑ saccadic duration, ↓ saccadic velocity
- Reflect deficits in executive function and motor control and consistent with dysfunction of the frontal lobes





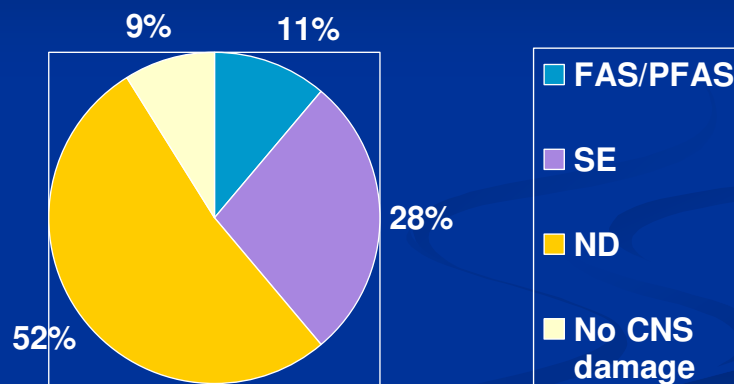


## Growth deficiency

- Prenatal
  - IUGR
  - SGA
  - low birth weight
- Postnatal
  - underweight for height
  - Shorter than predicted by parental heights

FASD	Alcohol Exposure	Growth Deficiency	Facial Anomalies	Central Nervous System
Fetal Alcohol Syndrome	Not Required	$\leq 10^{\text{th}}$ centile	Short PFL Flat Philtrum Thin Upper Lip	3 functional areas OR structural, neurological or MRI
Partial Fetal Alcohol Syndrome	Confirm		2 of 3 of the above	3 functional areas OR structural, neurological or MRI
Neuro-developmental Disorder	Confirm			2 or more functional areas

Review of 1400 clients with confirmed prenatal AE (Astley 2010)



## Behaviour

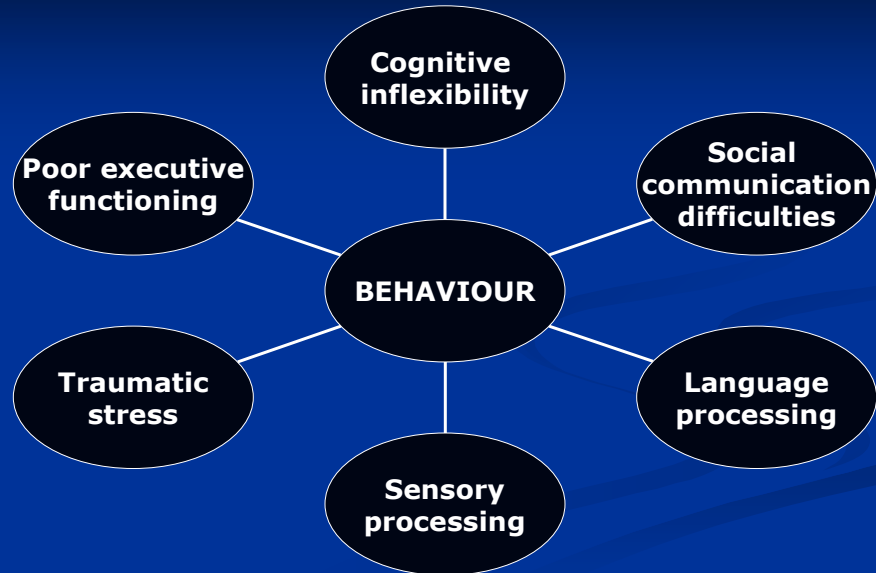
- Hoyme criteria - evidence of brain dysfunction

A complex pattern  
of behavioral or cognitive abnormalities  
inconsistent with developmental level  
that cannot be explained by  
genetic predisposition, family background  
or environment alone

## “Mimic” FASD and can be Co-morbid

- ADHD
- Oppositional Defiant Disorder
- Conduct Disorder
- Obsessive- Compulsive Disorder
- Autism
- Learning Disabilities
- Early Life Trauma
  - Attachment

## Sensory + Behaviour



Slide by Rachael Fallows

## Sensory Foundations for Learning



Slide by Rachael Fallows



## Early Childhood

- Developmental delay
  - Global - potential for Intellectual Disability
  - Language delay
  - Delay in FM and GM skills
  - Delay in social development
  - Hyperactivity, behaviour problems
- Sensory Integration Issues
  - Light sound texture
  - Arousal regulation
  - Circadian rhythm

## Sensory

- Sensory processing issues co-occur with behaviour problems
  - ↑ responsivity to tactile, aud + visual
  - ↓ responsivity
  - Sensory seeking
  - Poor auditory filtering
- Adaptive behaviour < expected for IQ
- Social Difficulties

(Franklin et al. 2008, Jirikowic et al. 2008)

Slide by Rachael Fallows

## Motor Skills

- Gross motor
  - ↓ quality
  - Poor balance + timing
  - Neuromotor + musculoskeletal
- Fine motor (> than GM)
  - ↓ fine motor + visual motor
  - Poor handwriting



(Osborn et al. 1993, Jirikowic et al. 2008)

Slide by Rachael Fallows

## Executive Function Deficits: A

- |   |  |
|---|--|
| ■ Arousal   | ■ Visual Spatial Processing  |
| ■ Processing speed and working memory impaired <ul style="list-style-type: none"><li>■ increasing task complexity</li></ul> | ■ Memory <ul style="list-style-type: none"><li>■ Recall, order</li></ul>       |
| ■ Encoding <ul style="list-style-type: none"><li>■ Miss on first learning</li></ul>   | ■ Language <ul style="list-style-type: none"><li>■ Grammar, syntax</li></ul>   |
| ■ Verbal and Visual information processing <ul style="list-style-type: none"><li>■ See part not whole</li></ul>             | ■ Abstract thoughts <ul style="list-style-type: none"><li>■ Concrete</li></ul> |
|   | ■ <i>Confabulation</i>   |

## Executive Function Deficits: B

- Emotion-based
  - Actions selected based on rewards and punishments
- Visual Discrimination **Reversal** test
  - FASD subjects slower to reach learning criterion
- IQ scores typically low to low average
- Social cues

*Maps to Orbito-frontal area of brain*

### Executive Fn.

- Planning
- Utilization of feedback
- Cognitive flexibility
- Response inhibition
- Concept formation
- Verbal fluency
- Non-verbal fluency

### Spatial Processing

- Place learning deficits
- Spatial recall
- Spatial reasoning

## Language

- Comprehension
- Disconnect
- Complexity
- Social cues

## Adaptive

- Younger than actual age
- Manual / Motor
- Independence
- Safety / Risk

## Neuropsychological Profile

- Executive Fn:
  - D-KEFS
    - Verbal fluency
    - Trail making
    - Progressive planning
    - Visual Discrimination Reversal Learning
- Attention
  - NES-3
  - Achenbach
- Visual Motor Integration –Beery-Buktenica VMI
- Spatial Learning and Memory
  - Morris virtual water maze
  - CANTAB
    - Spatial recognition memory
    - Spatial working memory
    - Spatial span
- Fine motor speed
  - Grooved peg board
- 92% overall accuracy from controls- CIFASD
- NOT IQ alone

## Measures which did NOT discriminate

- CANTAB
  - Motor screening
  - Big/Little circle
  - Pattern recognition memory
- Inter-hemispheric transfer
  - Finger localisation

## Measures which discriminated

- Working memory
- Planning
- Cognitive Flexibility
- Emotional executive function
- Spatial processing
  - Spatial recognition memory
  - Spatial span
  - Spatial working memory
  - Spatial learning and
  - VMI

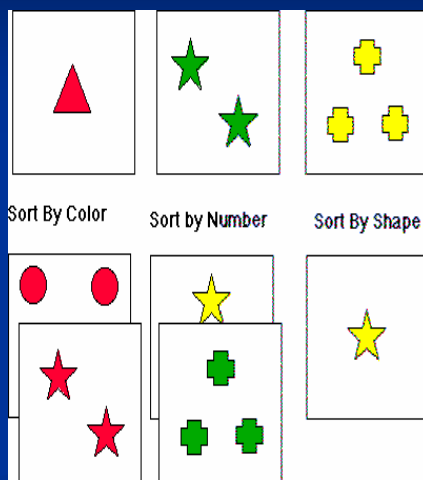


## Brief core measures

- U.N.I.T
  - Universal non-verbal intelligence test
- Children's colour trails
- Mazes from the U.N.I.T

## Neuropsychology tests

- Wisconsin Card sorting test
- Requires problem solving and cognitive flexibility
- Ability to shift attention: “conceptual set shifting”



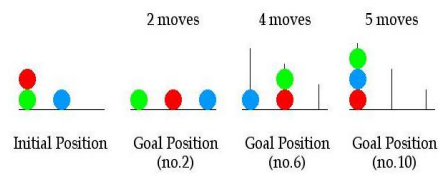
# Neuropsychology tests

- Tower of London

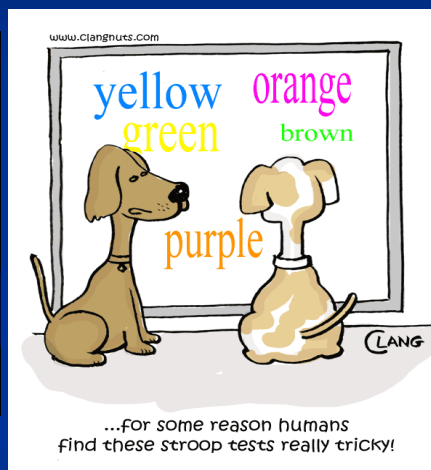
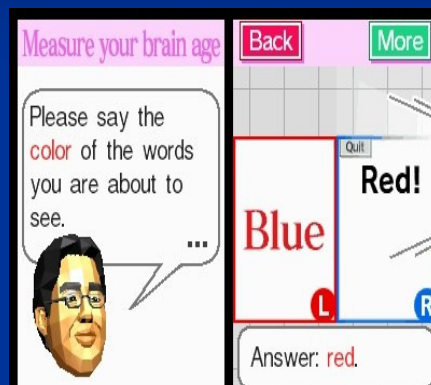
- Progressive planning test

## Tower of London Test

Shallice (1982)



## Stroop test



## ASSESSMENT: MOTOR SKILLS

	0-3yrs	4-6yrs	7-12yrs
<b>Standardised</b>	AIMS Bayley-III PDMS-2	M-Fun VMI *MABC-2 * <b>BOT-2</b>	<b>BOT-2</b> MABC-2 VMI DASH ETCH
<b>Non-Standardised</b>	HELP (0-3)	HELP (4-6) Clin Obs/COMPS	<b>QNST-II</b> Clin Obs/COMPS
<b>Function/ Participation</b>	HELP (0-3) COPM PEDI	HELP (4-6) COPM PEDI SFA	COPM SFA PEGS

## Assessment: Sensory

### ■ Assessment Tools

#### ■ Sensory Profile

- Infant/ toddler
- 3-12 yrs
- School Companion
- Adolescent/ adult
- Short Sensory Profile

#### ■ Sensory Processing Measure

#### ■ HELP (0-3yrs)

- Regulatory/ Sensory Organisation strand

### ■ Screening for language, social, behaviour and educational issues

“For students with FAS,  
misbehaviour is a means of  
communication – they are showing  
us that they do not know what they  
are supposed to do.”

*Debra Evensen*



# Attention

- FASD have most difficulty shifting attention and encoding new information
- ADHD children have more problems investing and maintaining attention
- FASD show deficits in fluid intelligence - solving new problems e.g. Raven's Progressive Matrices

## FASD

- Takes Risks
  - *No sense of danger*
- Does not complete work
  - *Poor processing*
  - *Flawed recall*
  - *Poor memory*
- Hits others
  - *Misinterprets*
  - *Misled*
  - *Fails to understand consequences*

## ADHD

- Takes Risks
  - *impulsive*
- Does not complete work
  - *Processes*
  - *Recalls*
  - *distracted*
- Hits others
  - *Impulsive*
  - *Misled*
  - *Fails to consider consequences*



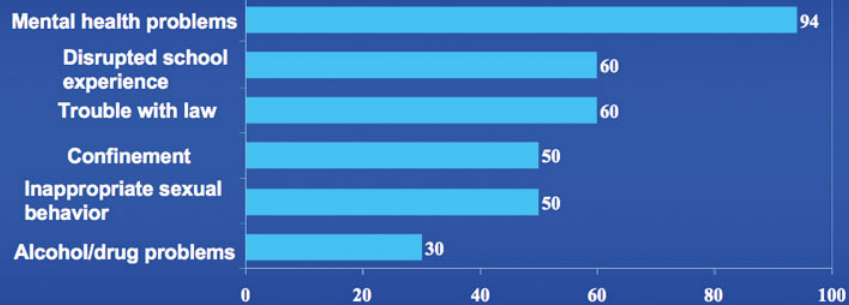
## Hyperactivity

- Hyperactivity can occur in the absence of intellectual impairment.
- Both FAS and ADD children show deficits in investing, organizing and maintaining attention and an increase in impulsive responses
- Prenatal alcohol exposure assoc with an increase in errors of omission, commission on continuous performance task.

## FASD and ADHD

- *O'Malley and Nanson 2002*
- ADHD is earlier-onset, more often inattentive subtype
  - comorbidity (complex learning disability and psychiatric)
- Clinical response to stimulants varies:
  - Denver: 80% response for ARND, 48% for FAS
  - UW : 47% response to methylphenidate FAS and ND
- Evidence for increased side-effects and increased sensitivity to dosage
  - Smaller dose - more frequent

## Long-term Consequences of FAS (N=473, Age Range 6-51 Years)

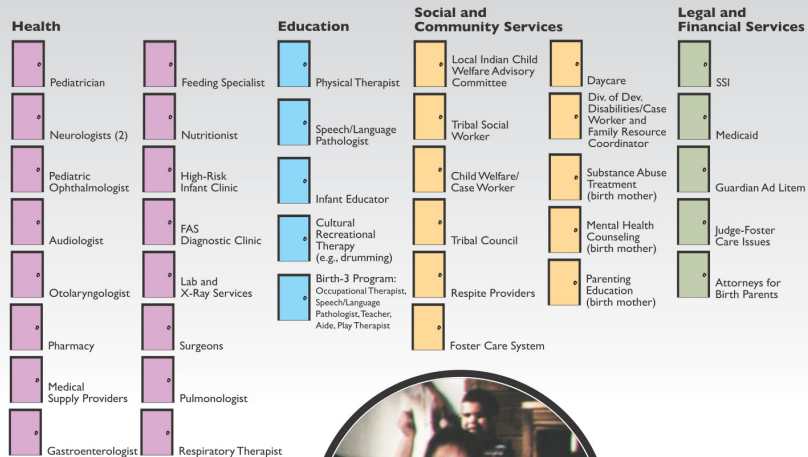


Source: Streissguth AP, et al, Final report, CDC Grant R04/CCR008515: August, 1996

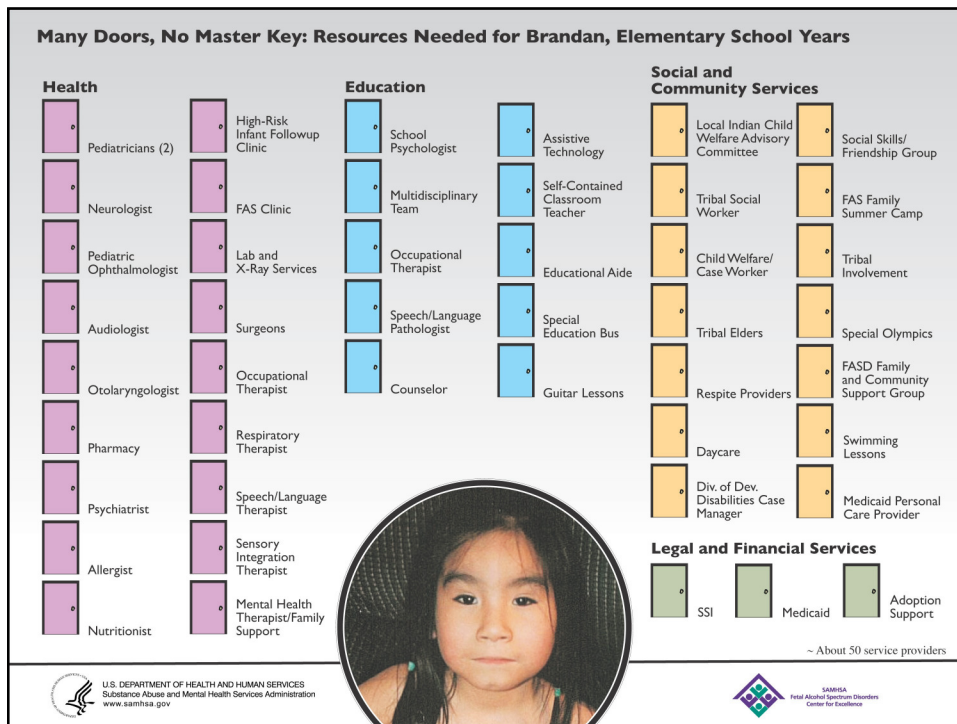
12

## Systems of Care

Many Doors, No Master Key: Resources Needed for Brandan, Age 1-2 Years



~ About 40 service providers



# Strategies

## Factors reducing 2° disabilities

- Early diagnosis (before 6yrs)
  - Recognized disabilities
  - Access to early intervention
- Stable home
  - More than 2.8 years in each living situation
  - No substance use
- Protection from violence
  - No violence against oneself
  - Links with support services

*Streissguth, et al. (1996)*

## Interventions

Pharmaceutical  
Behavioural

## Intervention

- Systematic review
  - 2 RCT's for stimulant medication
  - 7 studies of educational interventions
  - 3 studies of social communication & behavioural strategies

## Pharmacological intervention

- *Oosterheld et al 1998*
- Cross-over RCT
  - N=4, ages 5-12 years
  - 0.6mg/kg methylphenidate or placebo as tds dose for 5 days
  - Significant improvement in Hyperactivity-impulsivity on Connor's parent and teacher scales,
  - no difference for inattention



## Stimulants and ADHD

- *Synder et al 1997*
  - Cross-over RCT
  - N=12, age 6-16 years
  - Methylphenidate, pemoline (2) or dexedrine (1) vs placebo
  - 3 days, 1 day wash-out
  - No diff in attention on vigilance task
  - Hyperactivity – signif improved by stimulant meds on parent rating

## Stimulant response in FAS

- *O'Malley 2000*
- Retrospective analysis
- N=30, age 6-17 years
- Positive response in 22% of 23 given methylphenidate
- And 79% of 19 given dexamphetamine
- 10% negative response (3) to both drugs

## Medication and FASD

- *Frankel et al 2006*
- N=81, 42 prescribed medication
- 28 stimulants: dexamphetamine, methylphenidate
- 13 neuroleptics: risperadone, olanzepine
- 10 antidepressants, 8 non-stimulant, 4 mood stabilizers
- Concurrent Children's Friendship training -12 wks
- Concurrent Parent training

## Frankel study

- Results
  - Parent-reported self-control improved most with neuroleptics
  - Teacher-reported problem behaviour outcome best with neuroleptics alone
- Contrast with previous study showing +ve effects of stimulants on outcome of ADHD kids doing Friendship training

## Behavioural Intervention: Evidence

- Principles gained from FASD specific Ix studies
  - Inclusion of parents in the intervention process
  - Parent education/ training
  - Explicit instruction for learning skills rather than relying on observation or abstraction of rules, skills and knowledge from ongoing situations

## Behavioural Intervention: Principles

- Repetition:
  - takes longer to learn + remember
- Consistency:
  - regular routine + daily schedule; use verbal, visual + physical cues
- Concrete concepts: 1 instruction at a time
- Rewards + redirection, avoid punishment
- Analysis of behaviours
- Provide structured environment (physical + emotional)
- Close supervision
- Modelling of approp behaviour

## Skill Development

- Simple, concrete instructions
- Use of clear, concrete, and immediate consequences for behaviour
- Multisensory teaching techniques (visual, auditory, experiential)
- Training to recognize distress and ask for help
- Training in anger management, social skills, relaxation, and other life skills, adapted for individuals with an FASD

[http://www.fasdcenr.samhsa.gov/educationTraining/courses/FASDTheCourse/module6/mod6\\_ct\\_treat\\_stra\\_ppt.cfm](http://www.fasdcenr.samhsa.gov/educationTraining/courses/FASDTheCourse/module6/mod6_ct_treat_stra_ppt.cfm)

## Strategies for Success

- **Parent Driven/Practice Based**
- **Reframe the way we look at behaviour**
- **Visual** rather than verbal communication
  - to alert child that behaviour is not OK
- Consequences need to be **immediate**
  - add chore rather than take away privilege
- Provide a calming down area
- **Collaboration** between school and family

Sue Miers AM of NOFASRD, Broome 2010

## Strategies for Success

### Build on their strengths – Children with FASD:

- are usually Likeable, friendly, helpful
- often Talk very well
- can be determined
- can be good at art, music, sport, or computers
- can be good at spelling, reading and writing
- are often good with animals

From a talk by Sue Miers AM of NOFASRD, Broome 2010

## Strategies for Success

- Recognise the importance of relationships
- Have realistic expectations & redefine success
- Establish structure & routines
- Use simple, concrete language
- Modify the physical environment

From a talk by Sue Miers AM of NOFASRD, Broome 2010



## Behavioural Interventions

- <http://pubs.niaaa.nih.gov/publications/arh341/64-75.htm>

## Experimental Treatments and Strategies for Intervention

- <http://pubs.niaaa.nih.gov/publications/arh341/76-85.htm>

## Types of intervention and rehabilitation

- *Kalberg and Buckley*
- Ax of the learning profile
  - Functional issues related to deficits in executive Function
  - Functional Classroom Ax
- Intervention
  - Structure and systematic teaching
  - Visual structure
  - Environmental structure
  - Task structure
  - *Cognitive Control Therapy*
  - The role of the family

## Metacognitive Therapy

- Body-ego tempo regulation
  - Represents body-self and body movement
- Focal attention
  - Manner field scans field for information
- Field Articulation
  - Attends selectively ignoring other stimuli
- Leveling-sharpening
  - Compares images of past information with perceptions of present information
- Equivalence range
  - Manner in which individual categorises and conceptualizes information

## COACH

- Choosing Outcomes and Accommodations for Children By *Giangreco et al 2000*
- Education planning tool
- Resource to help schools work with families to set long term goals

## 5 Interventions

“Interventions for children with fetal alcohol spectrum disorders (FASDs): Overview of findings for five innovative research projects”

by Jacquelyn Bertrand

on behalf of the Interventions for Children with Fetal Alcohol Spectrum Disorders Research Consortium

Research in Developmental Disabilities 30 (2009) 986–1006

[http://depts.washington.edu/fmffasd/xctn/CDC\\_Bertrand%20Article\\_2009.pdf](http://depts.washington.edu/fmffasd/xctn/CDC_Bertrand%20Article_2009.pdf)

## 5 innovative research projects: 1

- Project Bruin Buddies
  - Parent-assisted Social skills training
  - 183 children 6-12 yrs; 96 completed the study
  - Child Friendship Training and Delayed Treatment Control (CFT and DTC)
  - Vineland and K-BIT
  - Social Skills Knowledge, Social Skills Rating System
  - Start, +12 wks, + 3mths
  - 12 sessions 90min over 12 weeks
  - ↑ social skills
  - ↓ problem behaviours

## 5 innovative research projects: 2

- *Claire Coles et al*
- Georgia socio-cognitive habilitation
- using Maths Interactive Learning Experience (MILE) program
- 3-10 yr olds, 87 recruited and 56 completed post-testing
- Readiness to learn and Caregiver training
  - Positive behavioural regulation
  - Methods for special ed and advocacy
  - Psychoeducational training and IEP
  - MILE + additional 6 weeks Mathematics intervention
- Both improved over time
  - MILE 58.6%; Psych 23.1%

## 5 innovative research projects: 3

- *Children's Research Triangle*
- Neurocognitive Habilitation
- Foster care or adoptive
- Systematic intervention strategy
- Education and support
- Enhance
  - capabilities to care
  - Self-regulation techniques
  - EXECUTIVE FUNCTION memory, cause, effect, reasoning, sequencing, planning, problem solving (ALERT)

## 5 innovative research projects: 3 cont.

- 78 foster and adopted children, ~ 6-12 yr
- BRIEF
  - Behaviour rating inventory of executive fn
- RATC
  - Roberts apperception test for children
  - Perceptions of common interpersonal situations
- 12 week intervention
  - In groups
  - Sequencing skills
  - Cause and effect
- Significant Improvement
  - Exec fn and self regulation
  - Less unrealistic storytelling

## 5 innovative research projects: 4

- Parent child interaction therapy
  - Reduced behaviour problems
    - Reduce behaviour problems
    - Decrease parenting stress
- 58 children 3-7 yrs; 14 weeks; 90 mins therapy
  - Two groups:
    - Parent-child interaction therapy (PCIT) -live coaching
    - Parent only support and management
  - Equally beneficial
    - trend that PCIT best

## 5 innovative research projects: 5

- Families Moving Forward
- 52 children 5-11 yrs; 9-11 m treatment
- Improve self efficacy
  - Reframing
  - Reduce child-related stress
- Modify specific parenting attitudes
- Reduced child disruptive behaviours

## Families Moving Forward Program

- Provided ongoing support to parents, help them understand their children
- Help parents hone skills they already have, add specialized parenting techniques to repertoire
- Add value to community resources and providers that families already find helpful
- Help families boost their progress, give reason to feel more effective and be optimistic about the future
- Aim of reducing the chance for secondary disabilities later in life



<http://depts.washington.edu/fmffasd/topics.php>

## Reframing



## Perceived Behaviour vs. Actual Situation

[http://www.fasdcenter.samhsa.gov/educationTraining/courses/FASDTheCourse/module6/mod6\\_ct\\_treat\\_stra\\_pg1.cfm](http://www.fasdcenter.samhsa.gov/educationTraining/courses/FASDTheCourse/module6/mod6_ct_treat_stra_pg1.cfm)

### Perception

### Actual Situation

Resisting	Can't understand or process verbal directions
Bad	Frustrated, defensive, challenged
Lazy	Doesn't understand, doesn't remember
Lies	Fills in, has memory problems
Doesn't try	Exhausted, can't start, or afraid of failure
Mean, rude	Defensive, hurt, abused, unable to interpret social cues
Constantly late	Can't tell time, can't get organized, doesn't get the concept
Doesn't care	Cannot show feelings, is protecting himself or herself
Refuses to sit still	Over-stimulated, needs to move while learning, doesn't know what he or she is expected to do
Trying to make me mad	Can't remember

## Perceived Behaviour vs. Actual Situation

[http://www.fasdcenter.samhsa.gov/educationTraining/courses/FASDTheCourse/module6/mod6\\_ct\\_treat\\_stra\\_pg1.cfm](http://www.fasdcenter.samhsa.gov/educationTraining/courses/FASDTheCourse/module6/mod6_ct_treat_stra_pg1.cfm)

### Perception

### Actual Situation

Immature	Doesn't understand social cues and rules
Thief	Doesn't understand ownership
Doesn't get the obvious	Needs many re-teachings, doesn't understand, despite intelligence
Makes the same mistakes over and over	Can't link cause to effect, can't see similarities, has difficulty generalizing
Doesn't work independently	Has chronic memory problems, can't translate verbal directions into action
Is overly physical	Is hyper- or hyposensitive to touch, doesn't understand social cues regarding boundaries
Uses poor social judgment	Not able to interpret social cues, needs help organizing

## Intervention: Motor Skills 1

- Develop specific skills to promote successful participation in typical activities of childhood
  - Prevent onset of secondary academic, social and emotional problems
  - No longer focussed solely on changing the child's motor abilities

## Intervention: Sensory 1

- Sensory Integration vs Sensory Processing
  - Over 80 studies have been conducted to test the effectiveness of SI based therapies
  - Only half have succeeded in demonstrating any type of success (Parham et al, 2007)
  - Other SP therapies are less adequately studied.

## Intervention: Sensory 2

- Evidence: Sensory
  - Evidence to support calming effect of deep pressure including people with ASD (Edelson et al. 1999)
  - No. of small size trials which demonstrate limited evidence for the use of specific Ix modalities e.g.
    - Weighted jackets
    - Move n sit/ Disco sit cushions

## Children with a FASD Can Learn

- Different pathways
  - Stepwise
  - Verbal
- Initiating tasks
- Shifting tasks
- Planning tasks
  - Sequencing
  - Ordering
  - Interpretation
- Task-orientated checking
  - Every step
- Planning successful work
  - External
  -
- Plan structural support
  - Space, environ
- Addressing
  - Impulse control
  - Emotional dysregulation
  - Awareness of others

## Replicate: school and home

- Repeat language for repeat instructions
- Simple, concrete, visual cues, hands on, gestures
- Train self-checking
- Slow down allow time
- Teach a new skill
- Practice, repeat review
- Take sensory breaks
- ask “do you need help”
- Observe for “pressure”

## Prevention of “failure”

- Predict behaviour escalation
  - Communication with home
- Remember functionally they remain younger than their chronological age
- Need to be taught everything
  - Even social cues
  - Adaptive self care
  - SAFETY

Maintain all therapies and services in place *if they are working*

*Do NOT* remove these *if and when* the child has improved

Understand what specific approaches succeed and

Retain these methods



## 8 Magic Keys: Evenson + Lutke

1. **Concrete** don't use words with double meanings, idioms, etc. "think younger" when providing assistance, giving instructions, etc.
2. **Consistency** difficulty with trying to generalize learning from one situation to another, they do best in an environment with few changes. This includes language. Teachers and parents can coordinate with each other to use the same words for key phases and oral directions.
3. **Repetition** Students with FAS have chronic short term memory problems; it may simply need to be re-taught and re-taught.
4. **Routine** Stable routines decrease their anxiety, enabling them to learn.
5. **Simplicity**
6. **Specific** Say **exactly** what you mean: difficulty with abstractions, generalization, and not being able to "fill in the blanks"
7. **Structure** Structure is the "glue" that makes the world make sense for a student with FAS.
8. **Supervision** Naïvete to daily life situations - constant supervision to develop habit patterns of appropriate behavior.

<http://www.fascenter.com/usa/documents/8magicKeys.pdf>

## 8 Magic Keys: Return Point

When a situation with a student with FAS is confusing  
and the intervention is NOT working:

Stop Action!

Observe

Listen carefully

*To find out where he/she is stuck*

Ask:

*What is hard?*

*What would help?*

# Environmental

## Home, School, Work Environment

- Safe, stable, and structured home
- Daily routines and structured activities with predictable choices, consequences, and transitions
- Consistent and supportive environment with realistic goals and expectations and responsibility for achievable tasks
- Appropriate educational placement
- Flexible environments with limited stimulation

[http://www.fiscalcenter.sambsa.gov/education/Training/courses/FASID/TheCourse/module6/module\\_6\\_treat\\_sra\\_pt1.cfm](http://www.fiscalcenter.sambsa.gov/education/Training/courses/FASID/TheCourse/module6/module_6_treat_sra_pt1.cfm)



## Classroom modifications

- Minimize distraction
- Minimise changes
- Minimise overstimulation
- Organise
  - Structure and routine
  - Space where learning
  - Structure of how learning
- Multisensory learning
- What happens at school reproduce at home

## Look at the fit between the child and the environment

- sensitivity to stimuli
- scheduling issues
- modify the environment to minimize distractions:
  - softer lighting
  - simplify the person's room
    - minimal furniture
    - limiting choices of clothing and games
  - visual cues
    - charts
  - study carrels
  - small classrooms
  - seat the child close to the teacher
  - color code label belongings

[http://www.fisdcenter.com/bsa.gov/education/Training/courses/EASDDTsCourse/mshub6/msh6\\_ct\\_tmat\\_sra.pdf.cfm](http://www.fisdcenter.com/bsa.gov/education/Training/courses/EASDDTsCourse/mshub6/msh6_ct_tmat_sra.pdf.cfm)

# Environmental adaptation



From a talk by Sue Miers AM of NOFASRD, Broome 2010



From a talk by Sue Miers AM of NOFASRD, Broome 2010

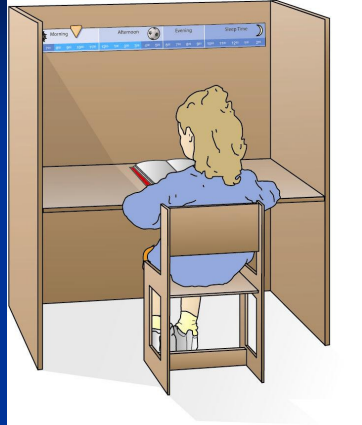


From a talk by Sue Miers AM of NOFASRD, 2010



From a talk by Sue Miers AM of NOFASRD, Broome 2010

From a talk by Sue Mlers AM of NOFASRD, Broome 2010



## Adolescence + Adulthood: 1

- Education of caregivers and individuals on specific issues
- sexuality
  - development, healthy, birth control options, protection from STDs
- residential placement
  - plan and implement of adult residential, vocational training and placement
- job placement
  - shift focus from academic skills to daily living and job skills
  - training in decision making skills
- financial management
  - guardianship for funds

[http://www.fasdcenr.cmhba.gov/education/Training/courses/FASDTheCourse/module6/module6\\_ct\\_treat\\_stra.pdf.cfm](http://www.fasdcenr.cmhba.gov/education/Training/courses/FASDTheCourse/module6/module6_ct_treat_stra.pdf.cfm)

## Adolescence + Adulthood: 2

- medical and health care support and subsidization
- appropriate mental health interventions
  - medication and therapy as needed
  - monitoring of social activities
  - structuring of leisure time
- juvenile justice
  - repeat offending
    - gender-based violence, substance use
  - probation
  - incarceration
- personal advocates

[http://www.fasdcenter.samhsa.gov/education/training/courses/FASDTheCourse/module6/mod6\\_ct\\_treat\\_stra\\_pg1.cfm](http://www.fasdcenter.samhsa.gov/education/training/courses/FASDTheCourse/module6/mod6_ct_treat_stra_pg1.cfm)

## Difficulty generalizing understanding abstract meanings and social situations

- Establish consistent routines.
  - when the timing changes, maintain the same order of events.
- Establish consistent rules taught at a young age
  - developing patterns of appropriate behaviour as an adult.
- Teach values in a concrete manner
  - structuring the environment.
  - teach a young person not to drink alcohol,
    - restaurants are o.k. but bars are not

[http://www.fasdcenter.samhsa.gov/education/training/courses/FASDTheCourse/module6/mod6\\_ct\\_treat\\_stra\\_pg1.cfm](http://www.fasdcenter.samhsa.gov/education/training/courses/FASDTheCourse/module6/mod6_ct_treat_stra_pg1.cfm)

## Accept the condition as a medical disability *that cannot be cured.*

- Individuals with a FASD grow, change, and improve *if*
  - their environment provides support for their cognitive differences.
- Help the individual understand his or her condition.
  - need to make sense to themselves.
  - include the person in developing solutions to problem behaviours.

## Accept the condition as a medical disability *that cannot be cured.*

- Do not punish individuals with a FASD for memory lapses.
- Provide a structure to remind them
- Provide places to go for help when they forget.
- Prepare the individual for difficult situations.
  - try role-playing how to interact with peers. persons with a FASD

[http://www.fasdcenr.com/educationTraining/courses/FASDTheCourse/module6/module6\\_et\\_main\\_sra.pdf.cfm](http://www.fasdcenr.com/educationTraining/courses/FASDTheCourse/module6/module6_et_main_sra.pdf.cfm)

## Prepare for transitions

- Prepare for transitions early and repeatedly for little and big events on a continuing basis.
- Provide opportunities for positive social experiences.
- Limit directions to one at a time using visual and auditory cues.
- Talk to the child, adolescent, or adult with a FASD using concrete terms and avoid idioms, words with double meanings, and other terms that can be confused.

■ [http://www.fasdcenre.samhsa.gov/educationTraining/courses/FASDTheCourse/module6/mod6\\_ct\\_treat\\_stra\\_pg1.cfm](http://www.fasdcenre.samhsa.gov/educationTraining/courses/FASDTheCourse/module6/mod6_ct_treat_stra_pg1.cfm)

## Department for Communities WA

- [http://www.communities.wa.gov.au/childrenandfamilies/parentingwa/parentingresources/Documents/Foetal\\_Alcohol\\_Spectrum\\_Disorder\\_FASD\\_Booklet.pdf](http://www.communities.wa.gov.au/childrenandfamilies/parentingwa/parentingresources/Documents/Foetal_Alcohol_Spectrum_Disorder_FASD_Booklet.pdf)
- Raise awareness about the serious issue of FASD
- Help change community attitudes and behaviours regarding alcohol consumption during pregnancy,
- Outlines the signs of FASD
- Outlines ways to support affected children.







## Equality before the Law Bench Book

Children with diagnoses under the general term of a FASD often have:

- brain damage
- birth defects
- poor growth
- developmental delay
- difficulty hearing
- difficulty sleeping
- problems with vision
- high levels of activity
- low IQ
- difficulty remembering and short attention span;
- language and speech deficits;
- problems with abstract thinking;
- poor judgement;
- social and behavioural problems;
- difficulty forming and maintaining relationships.

Chapter Four: People with Disabilities, Section 4.2.3.5: Fetal Alcohol Spectrum Disorders (FASD); As indicated at section 4.1.8.1  
[http://www.supremecourt.gc.ca/publications/pdf/equality\\_before\\_the\\_law\\_benchbook.pdf](http://www.supremecourt.gc.ca/publications/pdf/equality_before_the_law_benchbook.pdf)



## Health and Development

- Early diagnosis (before age 6)
- Support the family
- Careful monitoring of children's health issues and development
- Regular psychological, educational, and adaptive functioning evaluations
- Referral to infant development programs and preschools
- Therapy and medication as needed for FASD symptoms and co-occurring disorders
- [http://www.fasdcenter.samhsa.gov/educationTraining/courses/FASDTheCourse/module6/module6\\_ct\\_treat\\_stra\\_pg1.cfm](http://www.fasdcenter.samhsa.gov/educationTraining/courses/FASDTheCourse/module6/module6_ct_treat_stra_pg1.cfm)

# Diagnosis

- Under the age of six
  - Child development service
    - **Spell it out in referral**
    - Obtain neuropsych., report
    - Attention, memory, impulsivity, sensory seeking
    - Language
- Above age of six
  - Child development Service
    - Eligible for neuropsych., ax. at NSU Graylands
    - Language, inconsistency, memory – digit span
    - impulsivity, sensory seeking
- Older than 16
  - CAMHS
    - Eligible for neuropsych., ax. at NSU Graylands
    - Language, inconsistency, memory – digit span
    - impulsivity, sensory seeking

# Therapies

- Occupational therapy
  - Activities of daily living
- Psychology
  - Exec Fn and Memory Training
- Speech
  - Comprehension
- Physio
  - Self esteem
- Paediatrician
  - Co-morbid
- APSU study.....
  - siblings + other pregnancies

If a child, adolescent, or adult with a FASD is doing well with a certain level of structure and support, that positive response is the measure of the level of support needed for success.

Do NOT take away the support because the person is doing well.

[http://www.fasdcntr.samhsa.gov/educationTraining/courses/FASDTheCourse/module6/mod6\\_ct\\_treat\\_stra\\_pg1.cfm](http://www.fasdcntr.samhsa.gov/educationTraining/courses/FASDTheCourse/module6/mod6_ct_treat_stra_pg1.cfm)

## Diagnosis: Interdisciplinary

Every child and youth is unique

One treatment does not fit all

Each person needs specific and detailed understanding of their strengths and difficulties



*“Consider FASD”*



It is our job.....even if others do not make it theirs